REMARKS

Applicants have considered the outstanding official action. It is respectfully submitted that the claims are directed to patentable subject matter and are in condition for allowance as set forth below.

Claims 16-21 are rejected under 35 U.S.C. §112, second paragraph, as to certain terms or phrases as set forth in paragraph 2 at pages 2-3 of the office action.

Claims 16-21 are further rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description as set forth at page 4, paragraph 4.

Claims 16-21 have been canceled and rewritten as claims 22-26 which are based on claims 16-20. Applicants do not acquiesce in the §112 rejections. However, the terms or phrases as objected to by the Examiner have been clarified by amendment or removed from the claims in order to move prosecution forward.

The disclosure is objected to as to certain informalities at pages 19, 14 and 21. The informality at page 19 has been corrected, i.e., "the said layer" has been amended to read "the layer". As to the symbols « and », such have been amended at pages 6 and 14 to be replaced by

quotation marks. At page 21, the terms "ordinary" and "extraordinary" by definition refer to the rays provided by birefringence or double refraction. Birefringence is the division of a ray of light into two rays, the ordinary ray and the extraordinary ray, when the ray of light passes through certain types of material, e.g., calcite crystals, depending on the polarization of light. This is explained by assigning two different refractive indices to the material for different polarizations. The birefringence is quantified by $\Delta n=n_e-n_o$ where n_o is the refractive index for the ordinary ray and n_e is the refractive index for the extraordinary ray.

The outstanding rejections based on art are as follows:

(1) Claims 16 and 20-21 under 35 U.S.C. §102(e) as anticipated by U.S. Patent No. 5,998,556 (Kanto);

(2) Claims 16 and 18-21 under 35 U.S.C. §102(b) as anticipated by Great Britain Patent No. 758,136 to General Aniline Film Corp. (GAF) with U.S. Patent No. 4,259,407 (Tada) and

(3) Claim 17 under 35 U.S.C. §103(a) as unpatentable over GAF with Tada and further in view of U.S. Patent No. 5,528,400 (Arakawa).

The invention is directed to a process to manufacture an optical negative birefringent layer consisting of a monomer material or a prepolymer material. The optical negative birefringence is created by a deformation of molecules in the monomer material or the prepolymer material spontaneously provided during polymerization induced by an anisotropic mechanical strain due to shrinking the material layer in contact with and parallel to the substrate surface or the substrate surfaces. The deformation of the molecules is permanently frozen-in by cross-linking-polymerization in an appropriate short time.

Applicants have considered the applied art and respectfully submit that none of the patents applied by the Examiner describe a method for manufacturing an optical negative birefringent layer but rather describe a method for casting standard optically isotropic polymer films. The claims of the captioned application are directed to manufacturing an optical negative birefringent layer, which exhibits negative optical birefringence with the optical axis perpendicular to the layer surface. Applicants note that there is an essential difference between the concept described in the applied art and that described and claimed in the captioned application as evident by the manner and

speed of the claimed polymerization process, which based on the claimed deformation finally results in a strong strain-induced negative birefringence of the polymer layer.

As described in the captioned application, the polymerization takes place under anisotropic mechanical strain imposed on the monomer or prepolymer molecules in a very short time (in a few or 10 seconds), not allowing the polymer molecules to relax during the polymerization process. Therefore, the anisotropic molecular deformation is spontaneous and frozen-in during the cross-linking polymerization process leaving the polymer film exhibiting strong negative birefringence with the optical axis perpendicular to the polymer layer (see, e.g., captioned application WO 00/77561 A2: p. 8, paragraph 2; p. 9-10, bridging paragraph; p. 10, paragraphs 2 and 3; p. 11, paragraphs 2 and 3; p. 14, last paragraph, and page 15, paragraph 1).

In order to achieve the above manner of polymerization, the polymerization is preferably triggered by strong UV light (1000 W) and performed at high temperatures (just below the glass transition of the polymer) (see, e.g., WO 00/77561 A2: p. 13, paragraph 2 to the end of page).

The anisotropic mechanical strain conditions are created by unrestrained shrinking of the layer during the polymerization process in a direction perpendicular to the substrate surface, while the in-plane shrinking is influenced (hindered) by the rigid boundary surfaces of the polymer layer (see, e.g., WO 00/77561 A2: p. 10, paragraph 3).

The method is further limited to the polymer materials that by virtue of their chemical structure, being already polymerized, during the linear stretching tend to become optically positively birefringent (WO 00/77561 A2: p. 10, paragraph 2).

Additionally, the captioned application describes the use of the negative birefringent layer with the optic axis perpendicular to the layer plane for angular compensation of the positive birefringence of the LC layer with homeotropically aligned LC molecules, the situation found with LCD light shutters in the optically closed, dark state (angular compensation of the light attenuation). Such an application is completely different from that taught in Tada which describes the use of a negative-birefringent film with a tilted optic axis (oriented at a slant angle to the normal of the layer plane). Contrary to applicants'

application, the film taught by Tada is used to compensate for the colored appearance of super-twisted LCDs. Furthermore, Tada describes an already manufactured polymer layer laminated on a LCD, while a layer, as described in the captioned application is manufactured directly on an LCD and also serves the role of optical contact/adhesive (see, e.g., p. 15, paragraph 1).

Applicants submit that the use of the material layer as an OCL and with liquid crystal (LC) devices and that deformation are positively claimed. In fact, the polymerized material layer is identical with the so called "optical compensation layer" (OCL). Further, the negative birefringent properties of the material layer (OCL) are created by the frozen-in deformation of the monomer or prepolymer molecules in the polymerized material layer.

Kanto does not describe applicants' claimed invention according to the new claims 22-26. No teaching or suggestion can be drawn from Kanto that the polymerization of the material layer is conducted in such a manner that spontaneous deformation of molecules forming the monomer material or the prepolymer material, which solely is induced by an anisotropic mechanical strain due to shrinking the monomer or prepolymer layer in contact with and parallel to

the substrate surface or the substrate surfaces, is permanently frozen-in by cross-linking-polymerization and results in strain-induced negative birefringent properties of the material layer. Kanto also contains no teaching or suggestion as to providing the feature that the mass of the monomer material or the prepolymer material and thus the thickness of the OCL (d_{OCL}) is selected, such that the sum of the optical thicknesses at the fully cured OCL and the two polarization filters equals the optical thickness of the LCL $(\Delta n_{OCL} \times d_{OCL}) + p_1 + p_2 = (\Delta n_{LCL} \times d_{LCL})$.

The old casting manufacturing processes, as specified in the cited art, cannot produce a noticeable strain-induced negative birefringence, since the polymerization process is too slow, i.e., the strains relax by the time the polymerization is completed. The manner of applicants' polymerization provides spontaneous deformation of the molecules forming the monomer or prepolymer material that is permanently frozen-in by cross-linking polymerization and results in strain-induced negative birefringence properties of the material layer. Such deformation and birefringence properties are not obtainable using the methods of the applied art.

Accordingly, applicants submit that the applied art does not teach or suggest the claimed invention. Withdrawal of the §102 and §103 rejections is therefore respectfully requested.

Reconsideration and allowance of the claims is respectfully urged.

Respectfully submitted,

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